

CONTROL IC FOR LOW POWER AUXILIARY SUPPLIESABSTRACT

A non-isolated, low cost, switched capacitor converter for providing auxiliary power for use in systems with a wide range of input voltages up to 600 Vdc. The converter delivers low output power with low EMI at efficiencies of around 70%. The output voltage is either fixed or adjustable. A control IC is provided for controlling first and second semiconductor switches in the switched-capacitor converter. The converter includes a load resistance and a load capacitance connected in parallel; a first diode and a second diode connected in series the diodes being connected in parallel with the output circuit; first and second semiconductor switches connected in series; the semiconductor switches being connected between the supply voltage input and the output circuit; and a flying capacitance connected across the second semiconductor switch and to the diode junction point. The load capacitance is charged via the flying capacitance and the second diode in a charge cycle; and the load capacitance is discharged via the first diode and the flying capacitance in a discharge cycle. The control IC has a high side well powered by the input supply voltage which drives the first semiconductor switch; a floating well powered by the flying capacitor which drives the second semiconductor switch; and a control circuit powered by an output voltage. The control circuit delivers a variable amount of charge to the load capacitance per unit time. It increases a discharge frequency in response to an increase in load power demand, and maintains a predetermined fixed discharge time, until the discharge frequency reaches a predetermined maximum. Then, the control circuit maintains the maximum frequency and increases the discharge time in response to an increase in load power demand.